



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/600,075 | 06/20/2003 | Yukio Morishige | 16748 | 9161 |

23389 7590 12/13/2005

SCULLY SCOTT MURPHY & PRESSER, PC
400 GARDEN CITY PLAZA
SUITE 300
GARDEN CITY, NY 11530

EXAMINER

BUEKER, RICHARD R

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1763

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/600,075

Applicant(s)

MORISHIGE

Examiner

Richard Bueker

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) 7 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10 is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claims 1-6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claim 1, the phrase "a plasma unit for turning pretreating gas into a plasma state in air" wasn't in the specification as originally filed. Applicants have cited page 4, lines 4-7 and 27-28 as providing support for this limitation. It is noted, however, that the cited lines state that the pretreating gas that is to be turned into a plasma state can be air. This has a different meaning from the above quoted claim 1 limitation. In the claim 1 phrase "a plasma unit for turning pretreating gas into a plasma state in air", the recited "air" is treated as a different entity from the recited "pretreating gas". If the claim 1 phrase "a plasma unit for turning pretreating gas into a plasma state in air" were to be changed to "a plasma unit for turning pretreating gas into a plasma state, wherein the pretreating gas is air," then it would be properly supported by the specification at page 4, lines 4-7 and 27-28. It is also noted that the claim 8 limitation of "a pretreating unit for turning pretreating gas into plasma state by arc discharge in air" is in accordance with the meaning of page 4, lines 4-7 and 27-28, because it indicates that air can be used as the pretreating gas that is subjected to arc discharge to for a plasma state.

Claims 1-4, 6 and 8 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mikoshiba (5,803,974), who discloses a substrate processing apparatus that includes a laser (see Fig. 1 and col. 4,

Art Unit: 1763

lines 35-39) for radiating a laser beam to a deposition area on a substrate and a plasma unit for turning a gas into a plasma state. Mikoshiba teaches the use of an arc discharge (col. 4, lines 47-49 and col. 22, lines 36-39) to form the plasma. Mikoshiba also teaches (col. 10, lines 31-33) that the generated plasma can flow into contact with the substrate. The plasma formation gas of Mikoshiba can be considered to inherently be a "pretreating" gas. Also, the apparatus of Mikoshiba has an inherent capability of being used with the types of plasma formation gases that applicants describe as pretreating gas. The type of gas to be used in an apparatus is an intended use of the apparatus and is not as apparatus limitation per se. Also, regarding claim 8, it is noted that the claim limitation of "a substrate holder capable of moving a substrate having a pattern, said pattern having a defective portion" only defines a substrate holder and does not require any particular type of substrate to be present. Mikoshiba discloses (col. 9, lines 23-25) that his substrate holder is "capable of moving a substrate" as recited in claim 8, and Mikoshiba's substrate holder is inherently capable of holding a substrate having a defective pattern on it. Mikoshiba's apparatus inherently or at least obviously must include a control unit to control the operation of the laser and plasma unit to the extent required by claim 8.

Claims 1, 3 and 6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hongo (5,182,231), who discloses (see Fig. 1) a laser CVD device that is a pattern defect correcting apparatus, comprising a plasma pretreating unit (see plasma cleaning electrode 9 or plasma sputter electrode

Art Unit: 1763

21 for example) in combination with a laser CVD unit (23, 24, 25, 26, 22) as claimed in claims 1, 3 and 6.

Claims 1, 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo (5,182,231) taken in view of Shvets (6,419,752). Hongo's apparatus is a micro-fabrication apparatus that is a pattern defect correcting apparatus. Hongo also teaches the use of a focused ion beam (FIB) unit (see FIB 20 of Fig. 1) to remove material from a specific location on a substrate, prior to depositing a coating on that specific location by laser CVD using the laser beam 23. Hongo does not discuss the use of a plasma beam to remove material prior to the laser CVD step. Shvets however, discloses a plasma beam micro-fabrication apparatus, and he teaches that his plasma beam unit can desirably be used as a less expensive and less complex alternative to using a FIB unit for the material removal step in a micro-fabrication process. In view of this teaching of Shvets, it would have been obvious to one skilled in the art to modify the apparatus of Hongo by substituting a plasma pretreating unit of the type taught by Shevets for the FIB unit of Hongo.

Claims 2, 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo (5,182,231) taken in view of Shvets (6,419,752) for the reasons stated in the previous paragraph, taken in further view of Tsuchimoto (4,123,316), Ono (5,108,535) and/or Mikoshiba (5,803,974). Shvets does not specifically suggest the use of an arc to form his plasma. Shvets does, however, teach (col. 8, lines 10-20) that the particular mechanism for forming the plasma is not critical, and that a variety of conventional plasma forming means can be used. Tsuchimoto (paragraph bridging

Art Unit: 1763

cols. 5 and 6), Ono (col. 10, lines 22-30) and Mikoshiba (col. 4, lines 47-49 and col. 22, lines 36-39) teach that an arc discharge was a conventional, well known way of generating plasma for substrate processing. It would have been obvious to one skilled in the art to use an arc discharge to provide the plasma activation desired by Shvets, because Tsuchimoto, Ono and Mikoshiba teach that arc discharges can successfully be used to activate plasma for processing the surface of a substrate.

Claim 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112 set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claim 10 is considered allowable over the prior art of record.

Applicants have argued that the claim 1 phrase of "a plasma unit for turning pretreating gas into a plasma state in air" patentably distinguishes over the cited prior art. Applicants have cited page 4, lines 4-7 and 27-28 as providing support for this limitation. It is noted, however, that the cited lines state that the pretreating gas that is to be turned into a plasma state can be air. Therefore, it is clear that applicants intend this limitation to describe a type of gas that could be used in their apparatus as the "pretreating gas" that is intended to be formed into a plasma. Therefore, this claimed recitation of "air" is clearly a recitation of intended use which does not so limit the present apparatus claims. The plasma units of the cited prior art have an inherent capability of being supplied with "air" as a plasma forming gas. The recited air is not a structural feature of the claimed apparatus.

Regarding the effect of a recitation of intended use or a process-type limitation in an apparatus claim, see In re Rishoi, 94 USPQ 71; In re Young, 25 USPQ 69; Ex parte Masham, 2USPQ2d 1647; and Ex parte Thibault, 164 USPQ 666.

Applicants have also pointed to their specification at page 8, line 20 to page 9, line 6 as showing that their sequence of processing can be achieved in air. A review of this passage shows that it is true that it includes such statements as “the gas unit 6 supplies air-curtain gas” and “the film forming gas is supplied . . . in a state isolated from the external atmosphere by the air-curtain gas”. From these statements alone, it may appear that applicants’ process is practiced in the presence of air. It must be further pointed out, however, that at page 5, lines 13 and 14, applicants’ specification clearly states that “as purging gas and air-curtaining gas, inert gas such as N₂, Ar or He is used”. Thus, applicants’ specification is clearly using a non-standard meaning for the word “air”. According to applicants’ usage, “air” means ‘an inert gas such as N₂, Ar or He’. It is further noted that the passage at page 5, lines 13 and 14 does not suggest that air as it is conventionally defined (i.e. approximately 21% oxygen content) can be used as an alternative to an inert gas such as N₂, Ar or He. Instead, one skilled in the art would interpret this passage of applicants’ specification as meaning that the “air-curtaining gas” must be an inert gas such as N₂, Ar or He. In view of applicants’ teachings at page 5, lines 13 and 14, it must be assumed that applicants’ newly added claim recitation of “air” is intended by applicants to include N₂, Ar or He. The use of such gases are clearly within the scope of the disclosed plasma forming apparatus of the cited prior art.

Applicants have argued that Mikoshiba does not disclose or suggest pretreating the substrate with plasma gas prior to the CVD of film. It is noted, however, that claims 1-6 and 8 are apparatus claims, not process claims. The claim 1 limitation of "wherein the deposition area of said substrate is pretreated by said plasma unit supplying the plasma gas to the substrate prior to a film formed by CVD over said deposition area" is a recitation of a process of using the apparatus, and as such it is a recitation of an intended use of the claimed apparatus, and the apparatus is not limited to only this use. This limitation does require the apparatus to be inherently capable of being used according to the recited process. The apparatus disclosed by Mikoshiba (5,803,974) is inherently capable of being used in the manner required by this recitation of intended use. The plasma unit of Mikoshiba is inherently capable of being operated to supply a plasma gas to the deposition area of the substrate prior to the laser beam being activated to deposit a film by CVD. Supplying the plasma gas while the laser was not activated would constitute a pretreating step to the extent required by the claims. Also, Mikoshiba (5,803,974) provides a description of the operation of his apparatus (see col. 9, lines 16-39, for example) in which he describes the step of supplying plasma gas to the substrate processing chamber prior to a step of irradiating the substrate by laser. This step of Mikoshiba of supplying plasma gas prior to laser CVD meets the definition of "pretreating" and it meets the claim 1 limitation of "wherein the deposition area of said substrate is pretreated by said plasma unit supplying the plasma gas to the substrate prior to a film formed by CVD over said deposition area".

Art Unit: 1763

Applicants have argued that Mikoshiba does not disclose or suggest the problem of a laser deposited film cracking or failing. It is noted, however, that applicants' apparatus claims are not limited to processes related to films that crack or fail.

Regarding the rejection of claims 1, 3 and 6 over Hongo alone, applicants' arguments are not convincing because they do not address the features of Hongo that were discussed in the rejection. The rejection identifies either plasma cleaning electrode 9 or plasma sputter electrode 21 shown in Fig. 1 as representing a plasma pretreating unit. See also col. 4, lines 30-65 and col. 5, lines 30-49 of Hongo. The plasma cleaning unit of Hongo which incorporates a plasma cleaning electrode 9 is a "plasma unit for turning pretreating gas into a plasma state in atmosphere and supplying a plasma gas to a substrate" as recited in claim 1. It is noted that Hongo teaches (see col. 5, lines 38-49) the use of argon as his plasma forming pretreatment gas.

Furthermore, as previously noted above, applicants' specification at page 5, lines 13 and 14 makes clear that applicants consider argon to be air. Therefore, according to this definition provided by applicants' own specification, the argon or Hongo reads on the presently claimed 8. It is further noted, however, that the recitation of air is still merely an intended use of the claimed apparatus, and the claimed apparatus is not structurally limited in any way to being used only with air, regardless of the intended scope of the word "air".

Applicants also state that the office action on page 5 seems to acknowledge that Hongo does not disclose a plasma pretreatment means. This is incorrect. In the

Art Unit: 1763

rejection of Hongo in view of Shvets on page 5 of the office action, a different reason for obviousness is presented that is not related to the rejection based on Hongo alone.

Regarding the rejection based on Hongo in view of Shvets, applicants have argued that "there would have been no suggestion or motivation for combining Hongo and Shvets". As noted in the rejection, however, Hongo's apparatus is a micro-fabrication apparatus that is a pattern defect correcting apparatus. Hongo teaches the use of a focused ion beam (FIB) unit (see FIB 20 of Fig. 1) to remove material from a specific location on a substrate, prior to depositing a coating on that specific location by laser CVD. Hongo does not discuss the use of a plasma beam to remove material prior to the laser CVD step. Shvets however, discloses a plasma beam micro-fabrication apparatus, and he teaches that his plasma beam unit can desirably be used as a less expensive and less complex alternative to using a FIB unit for the material removal step in a micro-fabrication process. In view of this teaching of Shvets, it would have been obvious to one skilled in the art to modify the apparatus of Hongo by substituting a plasma pretreating unit of the type taught by Shevets for the FIB unit of Hongo. Thus, Shvets explicitly provides the motivation for combining his plasma pretreatment unit with Hongo's laser CVD unit.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 1763

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parvis Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard Bueker
Primary Examiner
Art Unit 1763